Appendix A

Marina Survey

The Interviewee

- Interviewee name, position, and phone number
- Date

The Facility

- Facility name
- Location
- Type of facility (marina, boatyard, yacht club, mooring field, fuel dock, boat ramp)
- Ownership (private, public, nonprofit)
- Total boat capacity (slips _____ + moorings _____ + out-of-water _____ = total)
- Restrooms available onsite?

The Pumpout Unit

Please describe the unit:

- Make and model: size, capacity, type of pump mechanism (centrifugal, diaphragm, or vacuum)
- Fixed or mobile

Where is the unit located?

Describe the pumpout's availability (to whom, hours of the day, days of the week).

Based on your experience to date, would you change anything about the unit/design/location of the pumpout system at your marina? Why?

Installation Costs

What steps did you take to purchase the unit, get a permit, and install the pumpout?

What was the approximate cost for purchasing the unit, designing/engineering its installation, permitting its installation, and installing the pumpout?

How much of these expenses was covered by a CVA grant?

Sewage Disposal

Direct line to municipal central sewer system:

- Describe the connection.
- Is it metered separately from other sewage discharges at the marina?
- What were the costs associated with the connection?

- How much of these expenses was covered by a CVA grant?
- How much are you charged by the sewer district for the associated sewage discharge?

OR, Line to an onsite sewage treatment system:

- Did the onsite system exist prior to purchase of the pumpout or was it installed specifically for the pumpout?
- What were the costs associated with the connection/installation?
- How much of these expenses was covered by a CVA grant?
- How often do you pumpout the onsite system and how much does this cost?

OR, Line to a holding tank:

- Did the holding tank exist prior to purchase of the pumpout or was it installed specifically for the pumpout?
- What were the costs associated with the purchase and connection?
- How much of these expenses was covered by a CVA grant?
- What is the per-gallon cost to dispose of the sewage?

Staffing

Is the pumpout self-serve or staffed?

What is the self-serve mechanism? What are the pros and cons of self-serve?

OR, How much does staffing the pumpout cost in time/salary? What are the pros and cons of a staffed pumpout?

Operation and Maintenance Costs

What are the costs associated with operation, for example electricity?

What sort of routine maintenance does your system require? Can you estimate your yearly routine maintenance costs?

Do you submit any of the costs associated with operation and maintenance of your system to the CVA for reimbursement? If yes, is that process user-friendly?

Vandalism/Theft

Have you experienced vandalism or theft of your pumpout system?

Have you incurred any costs associated with deterring vandalism or theft (e.g., fencing, extra security, or motion sensitive lighting)?

Do you think that one type of unit is more prone to vandalism than another?

Liability

In your opinion, is there potential for liability issues with the use of self-serve units?

How do you cover liability associated with the pumpout and what does this cost?

Do you have any experience with complaints or lawsuits concerning improperly handled boat sewage that resulted in illness?

Revenue Generation

How many pumpouts did you do last year? Average pumpout volume?

Do you charge boat-owners a fee for pumpouts? If so, how much, and do you think that there is any profit in that revenue?

Does having a pumpout generate related income (e.g., increased fuel sales)?

Does having a pumpout draw boaters to your marina?

Overall

What are the advantages/disadvantages of the method of pumpout operation at your marina?

Appendix B

Marina Interview Summaries

Broadwater Marina
Biloxi, MS

The President Casino Broadwater Resort is located on the Gulf Coast in Biloxi, Mississippi. The resort includes a full-service hotel, golf course, tennis courts, and a 118-slip marina. The marina caters to charter boat fishing and recreational boaters.

A stationary Waubaushene® vacuum pump was installed at the fuel dock in 1995. Marina staff offer pumpouts seven days a week, whenever the fuel dock is open. Management at Broadwater Marina feels that pumpout operation by marina staff is paramount to maintaining proper control of the unit. All staff are instructed on proper use of the system, including cleaning and sanitation between pumpouts. Regular customers pay a one-time $5 fee for unlimited pumpouts, and all others pay $5.00 each use.

Sewage from the pumpout is directed into the resort's holding tank with a lift station for disposal into the municipal sewer system. Because the holding tank and lift station were constructed for other facilities at the resort, sewage disposal costs associated with the pumpout were minimal.

The total cost of the pumpout, including design, permitting, equipment, and installation was approximately $7,500. Seventy-five percent of this cost was covered by a CVA grant. Costs associated with operation are considered negligible, while maintenance costs are estimated to be about $50 per year. In a typical week, the pumpout is used approximately four to five times.

There have been no incidents of vandalism or theft at the Broadwater Marina pumpout. The pumpout benefits from security provided for the nearby casino and hotel. Management feels that restricting access of the pump to trained staff will eliminate the possibility of lawsuits for improperly handled sewage.

Clearwater Municipal Marina
Clearwater, FL

The Clearwater Municipal Marina offers service to 120 permanent slip customers and over 500 transient boaters a year. A slip-side sewage collection system was constructed in 1995 with the aid of one of the first CVA grants awarded in the state of Florida. The collection system is powered by a Waubaushene® stationary central vacuum pump. Pumpouts are available to boaters free of charge, daily, from 6:30 AM to 6:30 PM.

Sewage is pumped directly into a municipal sewer system. All sewer connections were constructed at the time of the initial installation, and therefore covered by the original grant. The cost of the design, permitting, equipment, and installation was about $35,000. Seventy-five percent of the funding came from the CVA grant, through the Office of Waterway Management, Florida Department of Environmental Protection. The installation was timed to coincide with a major dock renovation, and marina staff did all construction.

The individual pumpouts at Clearwater Municipal Marina are self-serve. With the self-serve mechanism in mind, marina officials deliberately chose a unit that is easy to operate. Detailed operating instructions were provided to slip customers when the pump was installed; instructions are available at all times on the fuel dock, on each box containing pumpout hoses, and on the hoses themselves. In addition, the marina posts pumpout logos in the area and ran a publicity campaign that included news releases on local radio stations, newspapers and television stations. Usage of the pumpout is estimated to be about 120 boats per month.

The Clearwater Marina has not encountered any vandalism or theft of the system. The pump is enclosed in a gated area, and slip customers have a key to the gate. There have never been any complaints or lawsuits issued over boater misuse of the system. The positive publicity and the public education campaign have increased environmental awareness among boaters in the community, while contributing to the marina's bottom-line and enhancing their image as stewards of the environment.

Cypress Cove Marina
Venice, LA

Cypress Cove Marina is located in the fragile wetlands of Venice, Louisiana. It is a 150-slip marina that caters to recreational boaters and sportfishermen, while striving to protect Louisiana's coastal ecology. To that end, two Keco® vacuum pumps were installed when the marina was undergoing renovations in 1998. The plan was to allow marina customers to pumpout from a stationary pump at the fuel dock, or a mobile pump slip-side. A dumpstation was also purchased for vessels with portable toilets. The owners of Cypress Cove reported that they have been frustrated with the operation of the stationary Keco® pump from the start. They have found the manufacturer to be very slow to respond to their requests for service information and parts, and as a result the stationary pumpout was out of service for almost one year after installation.

Pumpouts are offered during regular fuel dock hours by marina staff. To keep staffing costs down while the stationary pump was out of order, the mobile unit was moved to the fuel dock. The owners would not recommend self-service. They feel it necessary to maintain control over the equipment, and although they have had no experience, they can see the potential for liability in a self-serve situation.

To accommodate renovation of an onsite hotel and restaurant in 1997, the owners of Cypress Cove had to purchase and install a package plant sewage treatment system. The cost of the

treatment system (more than $100,000) was not covered by the CVA grant because the treatment facility was not dedicated solely to the pumpout.

The design, permitting, equipment, and installation of both pumpouts and the dumpstation was contracted out at a cost of approximately $63,000. The equipment alone was about $12,000, and the location of the pump (over 600 feet from the treatment system) together with the remote location of the marina account for the remainder of the high cost. Seventy-five percent of these costs were covered by CVA grant through the State of Louisiana. Pumpouts are free for slip customers, and $5 for transients. The marina finds operation costs (i.e., electricity) to be negligible.

In spite of their trouble with the Keco® pump, the management at Cypress Cove believes that they are offering a valuable service, and that their customers appreciate it. Now that all pumps are operational, they hope to see usage increase during the upcoming boating season.

Dog River Marina
Mobile, AL

The Dog River Marina is a full-service, 70-slip marina located at the terminus of the Tenn-Tom Waterway in Mobile, Alabama. A Sealand Technology® vacuum pump was installed at the fuel dock in 1995. The pump is available to boaters daily, from 7:00 AM until 7:00 PM.

The marina has a direct line into the Mobile County sewage system. Boat sewage is pumped into a lift station, where it is held for a time before being transferred to another lift station, and finally into the municipal sewer system.

The total cost of the pump, including design, permitting, equipment, and installation was about $10,000. The marina management described the grant application process as “user-friendly”. Dog River Marina received a CVA grant that covered 75 percent of their expenses.

The pump is located at the fuel dock, and operated by fuel dock attendants. Most boaters pump out while fueling, so there is no extra cost associated with staffing at the pump. The service is offered free to slip customers and $5 to all others.

The fuel dock staff estimates that the pump is used about once a day. Operation costs (i.e., electricity) are considered negligible. Maintenance costs are very low: in the 5 or more years of operation it has required only one replacement part at a cost of about $30. The pumpout is cleaned and polished on a regular basis.

The marina has not experienced any theft or vandalism of the pumpout. The marina retains a 24-hour guard service, primarily to secure the boats. Because marina staff operate the pumpout, there is no history of liability associated with customer misuse.

If Dog River Marina were to upgrade their equipment, the manager expressed interest in slip-side service. He would like to install a system with direct lines to individual slips, and keep the unit on the fuel dock for transient customers.

Halifax Harbor Marina
Daytona Beach, FL

Halifax Harbor Marina is a 550-slip, two-basin marina located in Daytona Beach, Florida. The marina has three vacuum pumps and one portable toilet dumpstation for the disposal of sanitary waste. The northern and southern basins of the marina each have a Waubaushene vacuum pump located at the fuel dock. The marina has one mobile unit, also a Waubaushene pump, mounted on a small boat that provides pumpout service to customers slip-side. The stationary units are available daily from 7:00 AM until 6:00 PM. The mobile unit typically operates two days a week, servicing regular slip customers who sign up in advance.

Sewage from the pumpout is pumped directly into a central sewer system. All costs associated with connection to the central sewer were included in the system's construction. Because the marina is city-owned, they are not charged separately for their sewage discharges. The manager at Halifax Harbor Marina did some research on sewage flow meters and concluded that they may be costly to install, and possibly inaccurate.

The total cost for all pumpouts and the dumpstation was $47,000. The boat for the mobile unit was purchased at a cost of $22,000. Each of the pumps was about $5,000, and the dumpstation cost $1,500. The balance of costs can be attributed to engineering, permitting, and installation.

Monthly operational costs for all three pumpouts are about $1,200, including staff time. The boat-mounted unit is by far the most expensive to maintain, but 80 percent of all sewage collected at Halifax Harbor Marina is collected by the pumpout boat.

All Halifax Harbor Marina pumpouts are staffed. One operator is dedicated to the pumpout boat two days per week. The boat performs 80 to 90 pumpouts per week. The marina manager keeps a pumpout log and regularly suggests to slip customer that they are due for a pumpout. Pumpouts are also provided at the fuel dock during regular hours, when boats are fueling. Additional staff or time is not required, because a pumpout is generally quicker than fueling. Management at Halifax Harbor Marina does not recommend self-service operations; they feel it necessary to maintain control over the unit. In addition, because a bilge was once pumped instead of a holding tank, Halifax Harbor Marina staff are instructed to pump from labeled tanks only.

There have been no incidents of vandalism or theft at Halifax Harbor Marina. All pumpout equipment remains behind a locked gate at night, but the security is more for the fuel pumps than the pumpout. The marina had a liability issue when an operator pumped a bilge into the city sewer system, but they have had no problems with boaters handling their own sewage.

There is no charge for a pumpout at Halifax Harbor Marina. It is possible that free pumpouts lead to increased revenue at the fuel dock, and possibly an increase in the number of transients that come to the marina. In any case, the management at Halifax is committed to providing free, reliable pumpout service for the benefit of their customers and the environment.

Harbor Village Marina
Hampstead, NC

Harbor Village Marina is a 200-slip marina in Pender County, North Carolina that provides service to as many as 900 transient boaters per year. The marina had a Sealand® diaphragm pump for sewage pumpouts for several years until it was badly damaged in a hurricane. The pump was replaced with an Edson® vacuum pump, which has proven to be faster and less expensive to maintain. The pump is located near the fuel dock, and is available for pumpout 24 hours per day, seven days per week. Pumpouts are self-serve and free of charge.

Sewage from the pumpout flows into a lift station that moves it directly to the municipal sewer system. Currently, the water district charges the marina for total water usage (including freshwater used to clean boats, etc.), but management intends to install a flow meter to separate sewage costs in the near future.

The total cost, including design, permitting, equipment, and installation was approximately $10,000 to $12,000. Eighty percent of the cost was covered by a grant, with 75 percent from a CVA grant. The diaphragm pump from Sealand® was sensitive to debris and typically clogged up about three times per year. Typical repair costs for clogged valves in the Sealand® ran about $300 each. The Edson® pump clogs less, and therefore is less expensive to maintain; in addition it pumps faster. However, parts for the Edson® are relatively expensive. The most common problem reported for the Edson® was nozzle breakage from improper or careless use. The replacement hose nozzle costs about $150. Yearly maintenance cost for the Edson® is about $500. The pump gets fairly consistent daily use, from one to four times per day.

Maintenance costs can be at least partly attributed to the self-serve mechanism. Management concedes that although instructions are provided and assistance is available, the unit breaks because some customers are uninformed about operation, or just not careful with the unit.

The Harbor Village Marina has not experienced any theft or vandalism of the pumpout. The unit is out in the open at all times, available for 24-hour use. Despite the self-serve mechanism, the marina has not experienced any liability issues over improper use or handling of sewage.

Management at Harbor Village is happy with the Edson pump, and its location at the fuel dock. They do not see the pumpout as a moneymaker, rather as an opportunity to educate fellow mariners on environmentally conscious boating practices.

Island Moorings Marina
Port Aransas, Texas

The Island Moorings Marina, located in Port Aransas, Texas, is a private marina with approximately 285 slips. The marina acquired two Edson® vacuum pumps in 1997, and has been very satisfied with their performance. One of the units is attached to a movable cart for slip-side service, and the other is fixed at the fuel dock to service transients and fuel customers. The stationary unit is used about 10 to 15 times per week, while the mobile unit is used three to four times per day. Pumpouts are free for self-serve customers and $5 if conducted by marina staff.

The stationary pumpout is directly connected to the municipal sewer system. Sewage from the pumpout is metered together with discharge from other locations at the marina, like the public restrooms, restaurant, bar, and pool. Because the pumpout sewage is associated with the discharge from other revenue-generating sources, discharge from the pumpouts is considered a negligible cost. Costs for the sewer connection were included in the original installation charges and were covered by the grant.

Total cost for both units was about $13,000. A CVA grant covered the standard 75 percent, or about $10,000. Since the units were purchased in 1997, they have required only minor repairs. Because the pumpouts are so simple in design, customers can easily operate them and marina mechanics can repair them. The cost of operating the pumpout (i.e., electricity) is considered negligible.

The pumps are in the open and available to boaters 24 hours per day. Island Moorings Marina has not experienced any theft or vandalism of either unit. Even though the units are self-serve, the marina has not experienced any issues associated with liability. Marina staff teach customers how to use the pumpouts, and are available to help out with any problems during normal business hours.

Staff at Island Moorings marina feel the two units provide good coverage for all boaters wishing to use the pumpout. They are satisfied with the self-serve mechanism and the equipment itself. While the number of revenue-generating amenities at the marina make it hard to assess the impact of the pumpout on the marina's bottom line, the staff are satisfied that they are providing a valuable service, one that the customers use and appreciate.

Lakepoint State Park Marina
Lake Eufaula, AL

Lakepoint State Park is located on Lake Eufaula in eastern Alabama. The park boasts several amenities, including a motel, campground, cabins, and a full service, 200-slip marina. A Jonny-Trap® vacuum pumpout was installed at the marina in 1996. Cost of the pumpout, including design, equipment, and installation was $3,700. Seventy-five percent of the cost was covered by a CVA grant.

The pumpout is located at the fuel dock, and is available for use during daily business hours. Boaters operate the pumpout themselves, using the instructions provided on the unit. There is a direct line from the pumpout to a sewage lagoon. From the lagoon, waste is pumped into the park's sewage treatment system, along with sewage from the rest of the park. The pumpout sewage is not metered separately. All connections to the park system were made at the time of installation, and included in the original cost. Because the park is a state entity, they are not charged for sewage discharges from the pumpout.

Maintenance costs for the pumpout are very low. The hoses are susceptible to UV damage, and are periodically replaced at a cost of about $50 each. Operational costs are probably recovered by the $5 charged to non-slip customers. It is estimated that the pumpout is used as many as 10 times per week during the busy season (March through Labor Day).

The marina has not experienced any theft or vandalism of the pumpout. Access to the fuel dock and pumpout is restricted during non-business hours. In addition, the marina employs dock security staff after hours. All security costs are considered necessary to secure the boats, and are not associated with the pumpout. In spite of the self-serve mechanism, the marina has had no problems with liability.

While the staff would like to see more boaters take advantage of the service, they are satisfied with the mechanics, location, and operation of the Jonny Trap® pumpout.

Mariner's Village Marina
Mandeville, LA

Mariner's Village Marina is a 175-slip marina located on Lake Pontchartrain in Mandeville, Louisiana. The marina has been operating a Keco® diaphragm pumpout for the past 15 years and is currently in the process of obtaining a new Edson® vacuum pumpout. When the Edson is installed, parts from the Keco will be reconfigured to make a mobile unit for slip-side service.

The Keco® pump is located dockside, close to shore, and the new Edson® will be installed at the fuel dock. Pumpouts are currently available Tuesday through Sunday, from 9:00 AM to 5:00 PM. Pumpouts are free of charge and are handled by marina staff. Management at Mariner's Village feels strongly that staffing the pumps contributes to low maintenance and low cost operation, and they would not recommend self-serve operation.

The pump is directly connected to the municipal sewer line. There is a municipal usage fee associated with discharge, but it is considered to be very small as compared to water and utility fees for the rest of the marina.

Mariner's Village Marina retained the services of a contractor for all of the permitting, engineering and installation details. Total cost for the Edson pump will be about $16,000. Management found the grant application process to be somewhat cumbersome, with the paper work consuming an estimated 30 hours. Approximately $12,000, or 75 percent, of the total cost will be covered by CVA grant.

Operation of the Keco® pump requires an estimated $60 per year for maintenance. Costs associated with operation (i.e., electricity) of the pump are considered negligible. Management credits low operation and maintenance costs to the fact that only trained staff are using the pumpout. In addition, it is possible that relatively low usage (one to two times per week) contributes to the low costs.

The pump's hose and suction line are locked up at night. The marina has not experienced any theft or vandalism. There is no opportunity for liability resulting from customer misuse because only trained staff operate the pumpout.

Staff at Mariner's Village Marina are satisfied with the operation of their pumpout. They feel that the new Edson®, along with the reconfigured (portable) Keco®, will broaden their capabilities, and allow more customers to take advantage of the service.

Matagorda County Navigation District No. 1
Palacios, TX

Matagorda County Navigation District No. 1 is primarily a commercial port for shrimp boats. The District leases dock space to local fish houses by the linear foot, and routinely provides service to more than 400 boats. The District installed a Keco® vacuum sewage pumpout in 1996, at the same time that they installed several bilge pumps at the port. The General Land Office funded the bilge pumps, while the sewage pump was funded by a CVA grant through Texas Parks and Wildlife Department. The bilge pumpout is typically used 10 to 15 times per month, but it is estimated that the sewage pumpout is used only about once per month.

The sewage pumpout is connected directly to the municipal sewer line, and is not metered separately. It is located in a rather remote location, at the end of fixed pier, but it is adjacent to the bilge pumps. The cost of the entire sewage pumpout system, including engineering, equipment and installation, was $50,000 to $75,000. Electricity, water, and sewage lines had to be run more than 100 feet to land from the end of the pier, contributing significantly to the cost of the project. The District is not charged for discharge from the pumpout.

Both the bilge and sewage pumpouts are available weekdays, from 10:00 AM to 3:00 PM. The sewage pumpout is operated by the harbormaster's staff because of its proximity to the bilge pump, the use of which, by law, must be regulated. The harbormaster indicted that he would like to see the sewage pump operated as a self-serve unit in the future. Both bilge and sewage pumpouts are offered free of charge.

The harbormaster has not experienced any problems associated with vandalism or theft. A gate controls access to the pump, but the gate was not considered to be an appreciable cost. There have been no incidents that could lead to a liability issue, because the pumps are operated by staff. The harbormaster feels if he were able to institute a self-serve mechanism for the sewage pump, he could avoid the liability issue by inserting an appropriate clause into the slip contract.

The fact that the bilge pumpouts are used much more frequently than the sewage pumpouts suggests that the shrimp boats are discharging at sea. Shrimp boats typically go out for up to six weeks at a time, and it would not be possible to go that long without emptying the holding tank. It has been observed that at least some galley trash is typically retained for disposal on land. Perhaps an educational campaign aimed at the fishermen would help increase sewage pumpout use.

Inner Harbor Marina
Pascagoula, MS

The Inner Harbor Marina is located in a residential neighborhood, within Pascagoula city limits, and is accessible from the both the Mississippi Sound and the Gulf of Mexico. It is a small docking facility of 31 slips, occupied mainly by privately owned sailboats. A Sani-Service® pumpout was installed when the marina was renovating the bulkhead and installing new finger piers. The pump is located at the end of a transient dock, and available to all boaters, free of charge, 24 hours per day, 7 days per week.

The pumpout is directly connected to the city's sewer line. Connection to the sewer line was completed during the pier renovation project. Sewage from the pumpout is not metered separately. The city pays a sewage treatment fee to the Wastewater Authority for all city sewage. The marina pays a use-based fee to the city.

Total cost of the pumpout, including permitting, design, equipment, and installation, was about $10,000. About $7,000 was covered by CVA grant. Operation and maintenance costs are considered to be very low (approximately $100 per year for replacement parts, etc.). The hoses, are especially susceptible to UV damage, and can wear out quickly.

The marina has not experienced any theft or vandalism of the pumpout. The pumpout is not in an isolated area, but it is accessible 24 hours per day. Liability resulting from a sewage spill has never been an issue at Inner Harbor Marina. A spill-prevention mechanism on the pumpout ensures clean operation, and management feels that any spill would be a result of the user's carelessness.

The pumpout provides boaters with the opportunity to help keep their waters clean. Management finds that operation is simple, maintenance costs are relatively low, and the location is convenient. When area boaters were interviewed about the pumpout, they described it as a "life saver," and expressed an interest in seeing more in the area. The Grants Coordinator for the city of Pascagoula indicated that plans to install pumpouts in other areas along the river and bays have been abandoned, due to the high cost of sewage disposal in areas without direct connection to the municipal sewer system.

Town Pier
Columbia, NC

The Town of Columbia, North Carolina installed a Jonny Trap® vacuum pumpout at the pier behind the town offices in 1995. The town pier is very small and the pumpout is not used much. There are no amenities at the town pier. Boaters must go to the town offices and find an employee to perform the pumpout. Pumpouts are offered Monday through Friday, 9:00 AM to 5:00 PM, for a $5 charge.

The pumpout discharges directly to the municipal sewer system through lines that run under the boardwalk. Being a public facility, there is no charge for the discharge.

The pumpout cost the town $3,400, including permitting, equipment, and installation. The town planner found the permitting process to be relatively simple. One hundred percent of expenses were covered by a grant through the state of North Carolina.

Because usage is so low, operation and maintenance costs are considered to be negligible. The town planner estimated that the pump has been used only six to seven times in the last six years.

The town has not had any experience with theft or vandalism of the pumpout. The pumpout is in a fenced area. The town did not incur any extra costs associated with security of the pumpout.

Appendix C

Case Studies from Existing Documents

1.0 *Clean Marinas – Clear Value: Environmental and Business Success Stories*

Source: USEPA (U.S. Environmental Protection Agency). 1996. *Clean Marinas – Clear Value: Environmental and Business Success Stories*. EPA/841-R-96-003. August 1996.

Battery Park Marina, Sandusky, Ohio.
In 1996 Battery Park Marina installed a pumpout station at a fuel dock for $6,000 (including design, permit, and installation). Their cost was subsidized with a $4,350 CVA grant. The marina installed a portable toilet in 1990 for $400. The amortized annual cost of the pumpout and dumpstation is estimated to be $337 (includes a $20 annual maintenance cost). The pumpout line is hooked directly to the city sewer system; the city charges Battery Park no extra fee for the added boat sewage. Pumpouts are free for customers and $5 for others. Dock staff do all pumpouts. In 1995 the marina did over 1,000 pumpouts, generating an estimated 10,000 gallons of sewage. Pumpout income for 1995 was $1,500, and the pumpout service increased fuel sales by an estimated $11,000.

Brewer's Cove Haven Marina, Barrington, Rhode Island.
The marina has a two-station pumpout system with direct connection to the town's sewer line. Non-slip customers pay $5 per pumpout. In 1995, a low-volume, Doppler-type sewage flow meter and manhole were installed – at a cost of $6,800 – to measure 100 percent of the marina's sewage output. The cost of the flow meter and manhole were subsidized as part of the marina's CVA grant. The marina's sewer bill decreased from $3,410 in 1994 to $807 in 1995. Other marinas with sewer bills based on the volume of city water purchased should consider a flow meter, as the actual sewage volume produced will almost always be much less then the amount of water used at the marina.

Edwards Boatyard, East Falmouth, Massachusetts.
The boatyard installed a pumpout in 1995 for $4,500, of which $2,100 was covered by a grant. Sewage from pumpout operations is collected in a 2000-gallon watertight tank. In 1995 a commercial sewage hauler took 2,400 gallons to the town sewer plant for a cost of $150.

Hall of Fame Marina, Ft. Lauderdale, Florida.
For a capital cost of $16,200, the marina installed a pumpout system capable of pumping out megayachts in their own slips. With below-deck sewer pipes and connectors at each slip, the marina staff routinely empties one or more 1,000 gallon holding tanks each day using a portable pump. The system's annual labor and operation cost is $3,788. Pumping out a megayacht takes two people. The main from the pumpout system is tied into the city sewer line.

Kean's Detroit Yacht Harbor, Detroit, Michigan.
A commercial 200-gallon vacuum tank, located on land, pulls sewage through 120 feet of underground 2-inch line from four dockside stations, each with on/off switches. Each pumpout station is located at a fuel station. Sewage from the tank flows to the marina's sewer line to the city's system. For a capital cost of $12,000 in 1990, and an annual operational/maintenance cost of $1,040, the marina grossed $3,000 in pumpout income plus an additional $8,000 in fuel sales, as a result of providing convenient, one-stop, staff-operated (full service) pumpout service at the boat fueling station.

Oak Harbor Marina, Oak Harbor, Washington.
The marina's cost to design and build a floating pumpout/dumpstation/restroom was $58,600, paid by a grant. Annual operating and maintenance costs were $2,990 in 1995 ($795 operation; $975 supplies; $1,220 for parts). No pumpout fee is charged. The barge has a 3,000-gallon holding tank that is emptied an average of one to two times per month in season. Currently, the sewage gets pumped into a city truck, which transports it to a sewer plant without charge. In 1995, over 1,700 pumpouts were done, generating an estimated 40,000 gallons of sewage. It is estimated that the marina would have to pay $8,220 for commercial hauling and disposal, if the city weren't providing this service for free.

Other Important Points
- On average it takes about 7 minutes to pump out and rinse a typical 20-gallon holding tank
- Customers want to dock their boats once; good to provide both pumpout and fuel service at the same location.

2.0 *The Clean Vessel Act of 1992 Pumpout Grant Program: American Success Stories*

Source: Ross, Neil W. 1997. *The Clean Vessel Act of 1992 Pumpout Grant Program: American Success Stories*. A publication of the U.S. Fish and Wildlife Service. February 1997.

Green Cove Marina, Brick, Massachusetts.
In 1996 Green Cove Marina put a diaphragm pump and 225-gallon holding tank on a car trailer, creating a portable pumpout station, for a total cost of $6,300. A $2,600 CVA grant helped subsidize the cost, and the portable nature of the system eliminated the need for a coastal use permit, saving another $1,000. Marina staff do the pumpouts for a $5 fee. Annual 1996 income from 500 pumpouts was $1,700; it cost an estimated $1,900 for labor and $50 for electricity.

Other Important Anecdotes
- Marinas with pumpouts in Maryland are invited to participate in a State run operations and maintenance program. Participating facilities receive a fixed amount of maintenance grant in return for sending pumpout usage logs to the State.
- At the All Seasons Marina in Marmora, New Jersey, it cost $0.11 per gallon to have sewage removed from the holding tank.

- According to technical guidelines adopted by the USFWS, states should assume that 20 percent of boats between 16 feet to 26 feet will have portable toilets, and that 50 percent of midsize boats (26 to 40 feet) and 100 percent of large boats (40 feet and above) will have holding tanks.